Claims

1. A self-replicating recombinant vector comprising papilloma virus nucleotide sequences consisting essentially of

(i) a papilloma E1 gene and E2 gene,

(ii) a minimal origin of replication of a papilloma virus

(iii) a minichromosomal maintenance element of a papilloma virus, and

a heterologous nucleotide sequence encoding the HIV regulatory protein NEF, REV or TAT or an immunologically active fragment thereof.

2. A self-replicating vector of claim 1 wherein the papilloma virus is bovine papilloma virus (BPV).

3. A self-replicating vector of claim 1 ~~or 2~~ wherein the heterologous nucleotide sequence encodes the HIV-1 NEF protein.

4. A self-replicating vector of ~~any of the preceding claims~~ claim 1 wherein E1 is under the control of the srα promotor or the thymidine kinase promotor.

5. A self-replicating vector of claim 4 which is pBNtkREV, pBNsrαTAT or pBNsrαNEF as shown i Figure 2, 3 or 4.

6. A vaccine for DNA immunization against HIV comprising a self-replicating vector of ~~any of claims 1 – 5~~ claim 1.

7. A vaccine of claim 6 comprising a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

8. Method for preparing a self-replicating recombinant vector of ~~any of claims 1 – 5~~ claim 1, said method comprising

A) inserting a heterologous nucleotide sequence encoding the HIV regulatory protein NEF, REV or TAT or an immunologically active fragment thereof into a vector comprising papilloma virus nucleotide sequences consisting essentially of

(i) a papilloma E1 gene and E2 gene,

(ii) a minimal origin of replication of a papilloma virus, and

(iii) a minichromosomal maintenance element of a papilloma virus, and

B) transforming a host cell with the resulting self-replicating recombinant vector,

C) culturing the host cell, and

D) recovering said vector.

9. The method of claim 8 wherein the host cell is an E. coli cell.

10. Use of a self-replicating vector of ~~any of claims 1 - 5~~ claim 1 for the manufacture of a DNA immunization vaccine against HIV.

11. The use of claim 9 in the manufacture of a vaccine comprising a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

12. Method of treating or preventing HIV comprising administering to a person in need thereof an effective amount of a self-replicating vector of ~~any of claims 1 - 5~~ claim 1, and expressing the NEF, REV or TAT protein or an immunologically active fragment thereof in said person.

13. The method of claim 12 comprising administering a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

14. A host cell comprising the self-replicating vector of ~~any of claims 1 - 5.~~ claim 1

15. The host cell of claim 14, which is a bacterial cell or a mammalian cell.